



www.sciencedirect.com
www.rbmsociety.com



SYMPOSIUM: THE HISTORY OF THE FIRST IVF BIRTHS

The Oldham Notebooks: an analysis of the development of IVF 1969–1978. V. The role of Jean Purdy reassessed


Martin H. Johnson^{a,*}, Kay Elder^b

^a Anatomy School and Centre for Trophoblast Research, Department of Physiology, Development and Neuroscience, Downing Street, Cambridge CB2 3DY, UK; ^b Bourn Hall Clinic, Bourn, Cambridge CB23 2TN

* Corresponding author. E-mail addresses: mhj21@cam.ac.uk (M.H. Johnson), kay.elder@bourn-hall.com (K. Elder).



Martin H Johnson FRCOG, FMedSci, FRS is Emeritus University Professor of Reproductive Sciences and fellow of Christ's College, Cambridge, and Honorary Academic Fellow of St Paul's College, Sydney University. In 2014 he was awarded the Marshall medal by the Society for Reproduction and Fertility, and was elected an Honorary Member of the Physiological Society. He is author of *Essential Reproduction* (seventh edition, Wiley Blackwell, January 2013), co-editor of *Sexuality Repositioned* (2004), *Death Rites and Rights* (2007) and *Birth Rites and Rights* (2011), and has authored over 300 papers on reproductive and developmental science, history, ethics, law and medical education.

Abstract The role of Jean Purdy in the work leading to the birth of Louise Brown is assessed. We report that Purdy: (i) recorded and organized most of the data systematically; (ii) probably spent longer working in Oldham than did Edwards; (iii) whilst there, was primarily responsible for organizing laboratory supplies, including media preparation and testing; (iv) was involved in patient care; and (v) was a major source of support to Edwards. We find that Purdy, despite her nursing qualification, was not involved in laparoscopic egg retrieval and clinical aspects, but was focused on basic research activities. The evidence on who was present at embryo transfers is less clear, but suggests that Edwards was present for all, whereas Purdy may have been absent for some. Overall, we conclude that Purdy's role was a highly significant and under-appreciated element in the achievement of IVF in Oldham. 

© 2015 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

KEYWORDS: Edwards and Steptoe, IVF, Louise Brown, Oldham, Purdy

Introduction

Louise Joy Brown was the first baby born of an IVF procedure on 25 July 1978. Our analysis of research notes from the period from 1969 leading up to this event has described our archival research on the clinical and scientific aspects of the work. In those papers we reported on the numbers of patients and treatment cycles involved, and documented

the evidence underlying the approaches used to try to resolve the problems encountered (Elder and Johnson, 2015a,b,c). We also described our research into the ethical practice of Edwards and Steptoe over this period (Johnson and Elder, 2015a). In this paper, we analyse the organizational aspects of the notebooks that lead us to re-evaluate the role played by Jean Purdy in this programme of research.

<http://dx.doi.org/10.1016/j.rbms.2015.04.005>

2405-6618/© 2015 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Materials and methods

The data were abstracted from notebooks and loose paper sheets and scraps, anonymized and analysed as described in [Elder and Johnson \(2015a\)](#), which also describes the archival sources used. Briefly, these include archives at Cambridgeshire County Council (CCC), and papers relating to the late Patrick Steptoe, now in the possession of his son Andrew Steptoe (AS), papers held by Joe Schulman (JS), and papers among the possessions of the late Edwards and his late wife, Ruth Fowler Edwards, which have been kindly made available to us by their family (RGE). In-text references are indicated by the archive initials plus a reference number and date, and the details for each reference are recorded in the reference list. In this paper, we use data from the back pages of notebooks L1–4, 6 and 7, which record, in Purdy's hand, records of dates of travel to and from Oldham by herself and Edwards, plus records of accommodation used and meals taken. These incomplete data formed the basis for expenses claimed from Mr Holmes of the University of Cambridge Financial Board, some of which are recorded and priced (see [Johnson and Elder, 2015b](#)). The form taken by these records varies with time (for details see [Elder and Johnson, 2015a](#)), but include mostly travel, meal and accommodation expenses of Edwards and Purdy, although two additional sets of initials appear in the expenses records from January to June 1974, namely JS and IF. JS is identifiable elsewhere in the notes as Joe and IF as Ian. We have identified these two as Joe Schulman (confirmed by him) and Ian Fergusson: a letter from the former dated 8 July reads as though he only recently left the UK to return to the USA ([RGE1, 1974](#)), and the latter was known to be trying IVF at Queen Charlotte's and Chelsea Hospitals in London both before ([RGE2, 1973](#)) and after (JW, pp.14 and 40) this 6-month period at the beginning of 1974 (see also [Yovich, 2011, p.34](#)). In addition, scientific papers and the volume *A Matter of Life* ([Edwards and Steptoe, 1980](#)) have been consulted, as described in [Elder and Johnson \(2015a\)](#).

Reference to previously published interview transcripts is made by use of initials: GM (Grace MacDonald; [Elder and Johnson, 2015b](#), Suppl. Material 1), JW (John Webster), NF (Noni Fallows) or SC (Sandra Corbett – all in Suppl. Material 1 and 2, [Johnson and Elder, 2015a](#)). Each of these interviewees has consented to the use in this paper of all quotations by them. In addition, we include some quotes (with permission) from email correspondence with Alan Dexter (Managing Director at Bourn Hall from 1980 to 1983) and Dr Joe Schulman (former clinical and laboratory research colleague of Edwards, Steptoe and Purdy). Finally, we have interviewed Rosemary Carter, a long-standing friend of Jean Purdy, and Barbara Rankin (former secretary to Edwards from 1969 to 1987), and references to the content of those interviews are used throughout.

Results and discussion

Recording of the data

The loose sheets of notes and patient clinical/laparoscopy records from 1969 to March 1977 are records of follicle aspirations transcribed during the procedure, and are therefore

written by someone who was not in sterile attire for the operation, possibly the anaesthetist (JW, personal communication). The majority of the earlier records (1969–1970) have additional notes added by Jean Purdy in red ink, and a few (<10%) have additional notes added by Patrick Steptoe. A collection of 'scraps' of paper in Edwards' hand details follicle aspirations for a few cases in September 1969, which appear to constitute material written 'on the run'. All of this material was then written up in the 21 notebooks as described in [Elder and Johnson \(2015a-c\)](#). Most (circa 75%) of this writing-up was in Purdy's hand, the remainder being transcribed by Edwards himself, aside from one case written up in another hand, on 9 June 1974, now confirmed as being (mostly) that of 'Joe S'. Thus, Purdy played the major role in systematizing the data, which was used both for analysis and for publication of results.

Organizational aspects of the work

Table 1 shows the numbers of laparoscopic egg collection cycles initiated (column 3) and completed (column 4) by year. Initial peak years are 1969/70, dipping between 1971 and 1975, before rising to peak again in 1978. A finer-grained display of these data is given in [Figure 1](#), which indicates that cycles varied not only by year but also by month within each year, ranging between 0 and 18 per month.

Archival research offers explanations for some of this variation. Thus, interruptions to the work resulted from the fact that Steptoe had two hip replacements over this period (personal communication, Andrew Steptoe, who recalls 1972/73 and around 1976). This issue was first raised early in 1972 ([Edwards and Steptoe, 1980, p.119](#)) and it is possible that the first operation/recovery occurred between August and December 1972 (orange background in [Figure 1](#)), when only three laparoscopic oocyte retrieval (LOR) procedures were recorded. Steptoe's other hip became an issue in 1975 ([Edwards and Steptoe, 1980, p.124](#)), the operation occurring on the

Table 1 Summary of procedures carried out by year.

Year	Total procedures listed (n)	LOR that proceeded to attempted egg collection (n)	LOR in which egg collection was attempted and an outcome recorded (n)
1969	60	58	58
1970	64	62	59
1971	46	41	40
1972	41	40	40
1973	45	38	26
1974	43	35	35
1975	40	34	34
1976	58	51	48
1977	43	33	33
	[40SC; 3NC]	[30SC; 3NC]	[30SC; 3NC]
1978	80	65	63
	[2SC; 78NC]	[All NC]	[All NC]
Total	520	457	436

LOR = laparoscopic egg retrieval; NC = natural cycle; SC = stimulated cycle.

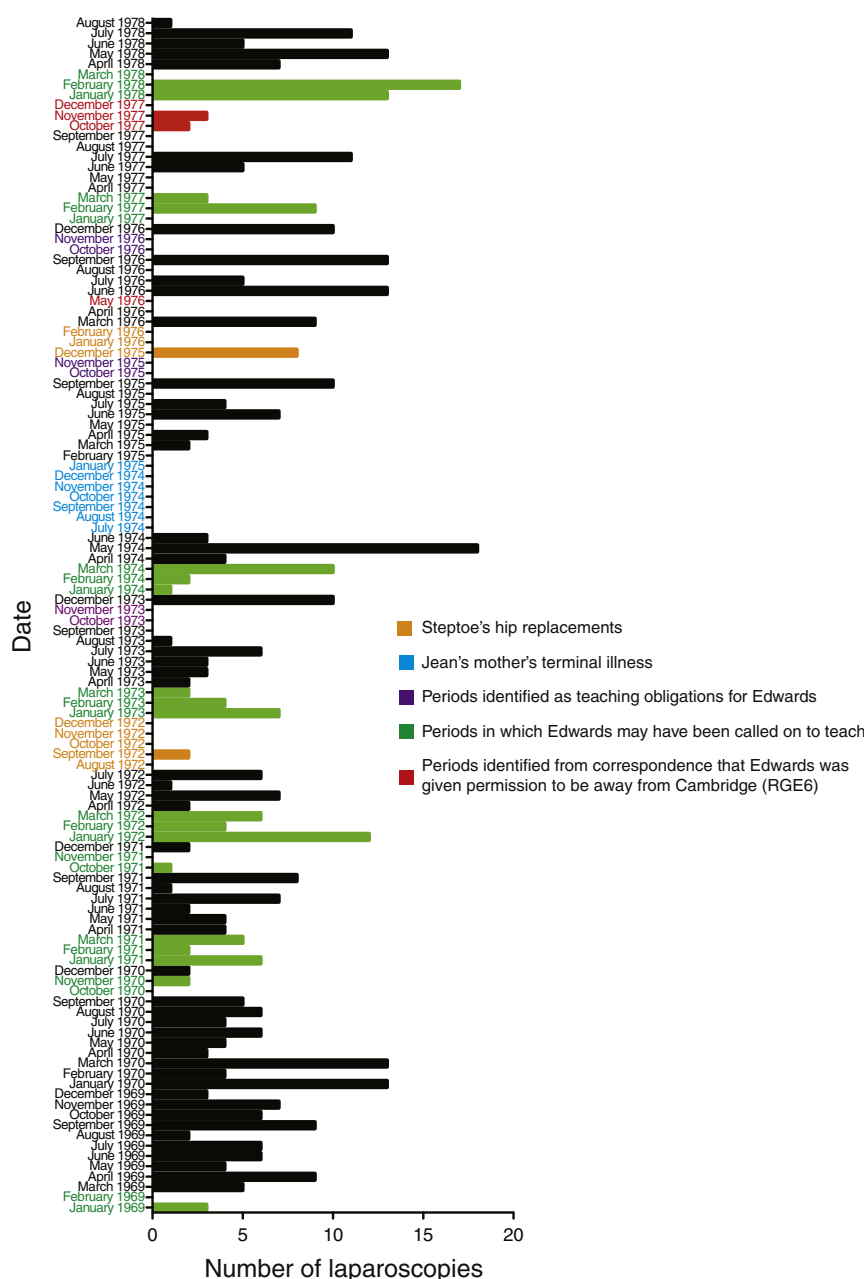


Figure 1 Plot of number of laparoscopies (for which a date is recorded, and regardless of outcome or purpose) against month and year. Colour-coded as follows: Orange = Steeptoe's hip replacements; Blue = Purdy's mother's terminal illness; Purple = periods identified as teaching obligations for Edwards; Green = periods in which Edwards may have been called on to teach; Red = periods identified from correspondence that Edwards was given permission to be away from Cambridge (RGE6, 1969).

1 December 1975 (AS1, 1975) followed by a period of convalescence in Barbados early in 1976 (orange in Figure 1; Edwards and Steptoe, 1980, p.132; dates consistent with those given in the interview with GM: Suppl. Material 1, p.11 in Johnson and Elder, 2015a). During this period, Gordon Faulkner is described as performing the laparoscopies (Edwards and Steptoe, 1980, p.132), which may account for the eight cases limited to December between October 1975 and March 1976.

A serious illness in Jean Purdy's family, namely the terminal illness of her mother with cancer (from Carter interview), meant that, according to Edwards (Edwards and Steptoe,

pp.122–3), neither travelled to Oldham for 9 months during 1973–74. In fact, these dates were misremembered and the period was actually July 1974–January 1975, which fits with the death of Purdy's mother in December 1974 (blue in Figure 1; an explanation corroborated by Schulman, 2010; RGE1, 1974; JS1, 2010). An explanation for the down-time is revealed in a description by Edwards (Edwards and Steptoe, 1980, p.122) of Purdy at this time as being 'particularly good with the patients', and her 'cooperation had become crucial. It was no longer just Patrick and me. We had become a threesome'.

During this down-time in Oldham, Edwards also reports trying unsuccessfully to be selected as the Labour party

parliamentary candidate for Cambridge (Edwards and Steptoe, 1980, pp.118 and 123). Having joined the party in 1969 (Edwards and Steptoe, 1980, p.86), he had been politically active as a Labour Cambridge City councillor for Newnham ward after his election in June 1973 (being re-elected in May 1976 for two years; www.cambridgeelections.org.uk), and served as chair of the finance panel and as a member of the city board (Wright, 2013). It is possibly his attempted parliamentary candidature that conditioned his inaccurate recall of 1973–74 as the down-time, because reports in the *Cambridge Evening News* of 13 June 1974 show that he was narrowly beaten by the subsequently unsuccessful Labour candidate, Jim Curran, having been tipped as his likely successor as late as 25 May 1974 (CCC1, 1974). Thus, this political foray seemed to have occurred in the run-up to, and not the end of, the down-time period.

It was also around this time that Edwards contemplated giving up the IVF work, discouraged by the lack of progress and funding, and his weariness with the continued criticism and spending so much time away from his family travelling to and from Oldham (Edwards and Steptoe, 1980, pp. 97 and 122–125). Indeed, interviewee Rosemary Carter suggested that it may have been Purdy who kept the show on the road, Edwards telling Carter that Purdy was really vital in going on with the IVF. Thus, when they were getting really depressed about whether the IVF was going to be able to continue, he had offered Purdy a choice of continuing with the IVF or focusing instead on another project on which he was working, namely “revitalising the blood”. Purdy, according to Carter, replied very firmly that she really wanted to do the IVF, and they went with that. The reference to “the blood” presumably reflects Edwards’ long established interests in stem cells (Cole et al., 1965, 1966) and reproductive immunology (Edwards, 1970; Johnson, 2011, p.249), which in the 1970s was engaged mainly via his then graduate student, Craig Howe (Howe, 1971), and subsequently with Peter Hollands (Edwards and Hollands, 1988; Hollands and Edwards, 1986). These ideas for using stem cells to populate the haematopoietic tissues were evident from very early in Edwards’ career (e.g. Edwards and Sharpe, 1971, p.88). The idea that Purdy was an important source of support for Edwards is echoed by Schulman (2010) who also wrote to us “In my opinion, she would undoubtedly have been a major supporter of keeping things going, and would – along with Patrick, who was a really tough, determined, optimistic man – have urged Bob to persist even when he might have felt discouraged. Furthermore, she and Bob were not only collaborators and colleagues, but good friends ... beyond a strictly scientific association. The combination of professional and personal closeness was also true for Bob and Patrick, very much so. In brief, I view Jean as a highly important team member and a strong facilitator and backer of Bob’s efforts ...”.

Further interruptions also occurred due to Edwards’ teaching obligations at the University of Cambridge. Thus, “It was during the Cambridge vacations when Patrick arranged for anywhere between 8 to 16 patients to come along in the summer holidays, Easter holidays, Christmas holidays, and then Bob and Jean would come up and we’d get on with the work.” (JW, p.3). Edwards also gives this as a reason for avoiding October/November 1968 (Edwards and Steptoe, 1980, p. 81).

Examination of the *Cambridge University Reporter* did not in fact reveal that Edwards had major lecturing commitments in October and November 1968, but this period did coincide with the second-year practical classes in reproduction, the staffing of which is not recorded in the *Reporter*, and for which Edwards may have had teaching commitments. Indeed, in general, from 1975 onwards, LOR procedures tend to concentrate outside the university terms, consistent with the memories of JW, who arrived in 1974 (JW, p3). Those periods (outside of those already identified as being inactive for the reasons given above) identified from the *Cambridge Reporter* as clear commitments for Edwards are shown in purple in Figure 1., and those periods during which Edwards was likely to have had some teaching commitments are shown in green (see also Suppl. Material 1). Finally, periods identified from correspondence that Edwards was given permission by the University to be away from Cambridge on leave or to attend meetings are shown in red.

Thus, taking into account these interruptions, it seems clear that there is a transition from a fairly sustained activity between 1969 and 1972 to a much more episodic pattern of activity thereafter until 1978. It is also clear that Edwards’ extensive other professional commitments placed constraints on his availability, constraints experienced less by Purdy, as the next section indicates.

The expenses record

The expenses record, although incomplete, sheds further light on the relative roles of Edwards and Purdy in the Oldham work. Table 2 summarizes by year the days and journeys recorded for both Edwards and Purdy. From this Table, it is evident that some data are not recorded in the books. It is possible to align most of the periods for which Edwards and/or Purdy are recorded as being in Oldham with dates of laparoscopies. However, whilst this correspondence is almost exact for 1972 onwards (for those periods where data are available), it is less good between 1969 and 1971, for which laparoscopies are recorded as occurring without either of them being accounted for in the expenses records: 1969 – 11/59; 1970 – 6/60; and 1971 – 3/42. Since it is inconceivable that neither was present, this discrepancy may reflect a less rigorous attention to expenses recording and recovery at first, when it was unclear just how long the work was to continue. In addition, between 1969 and 1971, visits to Oldham are recorded as being mostly restricted to the time of laparoscopy, but thereafter most visits were extended to last between 1 and 6 days after the egg recovery, presumably reflecting the fact that from 1972 many cycles involved embryo transfers (Elder and Johnson, 2015b), in which both Edwards and Purdy were involved (see later). From 1977, when natural cycles were started, and more cases for embryo transfer came through on the same day, often necessitating rapid turn round of the sterile equipment between early morning and late evening collections, the Oldham nursing staff, especially Noni Fallows and Sandra Corbett, also became involved in the preparations for transfers (NF, p.21; SC, p.4). Other visits after 1972 did not coincide with egg recoveries at all (combined in bracketed figures in Table 2). For some of these extended or ectopic visits, explanatory information is available, e.g. for “Lab

Table 2 Inferred numbers of days spent in, and trips to and from, Oldham for Edwards and Purdy, estimated from expenses claims.

Year	Edwards		Purdy	
	Days	Trips	Days	Trips
1969	32 (1)	24	18 (0)	11
1970	44 (9)	26	50 (28)	18
1971	46 (13)	26	58.5 (29)	22
1972	54 (34)	18	71.5 (53)	15
1973 ^a	23 (12)	7	25 (16)	7
1974 ^b	13.5 (5)	8	41 (20)	8
1975	37 (20)	10	39.5 (22)	11
1976	71 (41)	10	55.5 (31)	13
1977 ^a	8 (4)	1	8 (4)	2
1978 ^a	0	0	24 ()	0
Totals	328.5 (139)	130	367 (183)	107

Values in brackets represent the number of whole days on which egg recovery was not occurring for those periods for which expenses records have been found.

^aIncomplete data.

^bIn addition, notebooks record 'Ian' as claiming for 4 days and 2 nights in January and February, and 'Joe' as claiming or being present for 32 days and 20 nights between January and June.

work" on 20 August and 30 September 1970; for "making media for 12 March" on 7 February 1971; for "media and paraffin tests" on 14 December 1975; and for embryo transfer on 14 June 1976. Thus, many of these periods were used for preparation and problem-solving, as described in [Elder and Johnson \(2015c\)](#).

An examination of [Table 2](#) reveals that Edwards spent less time in total on more visits than did Purdy, presumably reflecting his other responsibilities. However, the patterns of involvement varied, with Edwards spending more time in Oldham than Purdy during 1969, and as much or more time between 1975 and 1977, when the number of patients who developed embryos suitable for transfer began to increase.

It is strongly suggested in the interviews that, despite her nursing qualification, Purdy was not involved in laparoscopic egg collection. Thus:

... we assumed Jean just helped with the preparation of media because you couldn't buy the media already made-up in those days – it was all measured by volume and in grams and whatever – and sterilising dishes, sterilising the equipment that they'd use in the lab. I don't recall Jean doing any ... actually identifying of the eggs under the microscope when the follicular fluid was taken into the lab. Bob always did that. What her role was after that, whether she inseminated the oocytes or not, I'm not sure. (JW, p.10).

This view was echoed by Corbett, who described Purdy as being present at egg collection, but not involved directly (SC, p2). Indeed, the photograph ([Figure 2](#)) of Purdy assisting at egg collection was taken in Oldham General Hospital (pre-Kershaw's; NF, personal communication) and was probably posed. Hints are given that Purdy's exclusion may have been in part due to Muriel Harris: "That was Muriel's

domain" (NF, p.11), and "it was Muriel's nursing staff. And what went on in theatres, Muriel was the boss" (NF, p.12), and "I think there might have been something between Muriel and Jean" (NF, p.21). Thus, Patrick had his already well-established nursing team, and there would have been no reason for Jean to start being trained as one of them. Rather, Purdy's role is described as being primarily scientific in the lab (see above quote), although it is unclear whether she ever searched for and later inseminated aspirated eggs (JW, p.10). Schulman provides further insight into her role, recalling that, during the first 6 months of 1974, Purdy "was involved in the laparoscopic egg retrievals; Patrick did the follicle aspirations alone or with my surgical assistance, the aspirated oocytes were drawn under controlled suction into sterile tubes, and then Jean took the tubes from Patrick in the OR [operating room] and brought these egg-containing tubes immediately to Bob in the adjacent laboratory. My memory is that during 1974 Bob always personally identified the oocytes and he or I carried out the inseminations. He (or sometimes I) examined the eggs and embryos for pronuclei, etc. ... I do not recall Jean doing any lab work via actually handling eggs or embryos 'under the microscope' in 1974, but I have no knowledge about her role thereafter.", although others have verified that subsequently, and even at Bourn Hall, she observed embryos, eggs and sperm but never manipulated them, her role being to observe the stage of the embryo and to let Edwards know when it was ready for transfer.

Likewise, the written evidence suggests that Edwards was present for most of the embryo transfer procedures; thus, comments in his hand about the embryos, either at the time of ET or earlier on the same day, or some scribbled note about the procedure, are present for 109/112 cases



Figure 2 Posed photograph of Purdy at 'laparoscopic egg collection' – something she evidently never did (see text). (©John Fallows, reproduced with permission).

(Suppl. Material 2a,b). Of the three cases where his handwriting is not present on the day, two of those are for the second and the third embryo transfers carried out, respectively, on the 7 January 1972 (second) and on the 20 March 1972 (third); his handwriting is possibly absent because Purdy wrote the details down for him. The third embryo transfer with no sign of his handwriting is no. 91, on the 25 February 1978, during which period there was usually only a single embryo to look at, which was replaced on day 3; Edwards' notes are less frequent than in the previous years, because there was less to record. However, he did write notes for the subsequent embryo transfers, numbers 92, 93, 94, so again we suspect that for no. 91 Purdy wrote it down, and he had nothing to add. A key role for Edwards in embryo transfer is supported by Schulman, who writes: "[in the first 6 months of 1974] Bob loaded the embryo transfer catheters himself and did all of the trans-cervical transfers, while, in the few cases [e.g. 30 April 1974] of trans-uterine transfers with a long needle entering the uterus from above, Patrick did the transfers." Finally, evidence from Edwards himself is provided in his handwritten note among the loose LOR sheets saying on 30 June 1975: "Patrick – I would like to do the Sunday laparoscopies at 4.30 & 5.30 – can you manage this? Then we can do the transfers on Friday evening at 9pm. I have engagements in Cambridge on Wed & Thurs afternoons, and Friday 4-5.30, but could be here by 9pm." [But note that no embryo transfers could have resulted from these LOR procedures – see Table 3]. Purdy may have been present for only some embryo transfers, as Corbett recalls, in answer to a question about who was present at the embryo transfers, that "Bob was there then" and that Purdy "often wasn't there when they happened." (SC, p.2).

However, these conclusions appear to be contradicted by data from a cross-correlation between the expenses records, from which the presence of Edwards and Purdy in Oldham has been inferred (Table 2), and the dates of embryo transfers (see Table 3). From these data, which are informative for just 63 of the 112 embryo transfers, it appears that both were inferred as not present for only 1/63 embryo transfers on 18 February 1977, that Purdy was inferred as not present for 14/63 embryo transfers, and that Edwards was inferred as not present for 20/63 embryo transfers. Especially critical for the above conclusions is the apparent absence of Edwards from 32% of the embryo transfers. For seven of these 20 embryo transfers, Joe Schulman was recorded as being present. However, Schulman recalls that "Certainly they were both there for all of them [the embryo transfers] in 1974. I did not do any human embryo transfers in 1974 without Bob being present". Two of the three clusters of Bob's inferred absences coincide with periods when he may have been expected to teach (e.g. Jan–Mar 1972 and Feb–Mar 1974; Figure 1). However, his inferred absence in December 1975 is curious since this was after Steptoe had had his hip operation and Gordon Faulkner (Edwards and Steptoe, 1980, p.132) had taken over the eight LOR cases (Figure 1). These anomalies make it likely that the expenses record is less completely detailed for Edwards than for Purdy, and possibly incomplete for both. In conclusion, although the archival evidence as to whether Edwards was present for all the embryo transfers is incomplete, he was clearly present for most and probably for all, whereas Purdy's presence at all embryo transfers is less established.

Personal memories

Those who knew Purdy, whether as patients, friends or colleagues, uniformly give an impression of her as being kind and unassuming. Thus, patient Grace MacDonald (Elder and Johnson, 2015b see Suppl. Material 1 GM, p.14) said:

So, that's when I met Jean, and she, again, was just wonderful. You know, she made us all feel, you know, so, just relaxed and ... that ... they were going to do their best for us and she was, she was just incredible.

[and]

very, very supportive, and Jeannie too. (GM, p.17)

Schulman also commented on Purdy's role with patients "She often interfaced with both husbands and wives on retrieval day."

Purdy's gentle and unassuming collegiality also comes through in the two interviews with the nurses. Thus "You know – nothing was too much trouble. If you needed any help, she'd help." (SC, p.29), and "[Jean] she was always very quiet, very petite ... She reminded me of a little mouse." (NF, p10). Likewise, both Rosemary Carter and Barbara Rankin recalled how generous and how quietly helpful she always was to everyone. They also commented on her sensitivity, her musicianship, and artistry (Figure 3a). She indulged her passion for music with a collection of classical music records and playing violin in the school orchestra, she was a fine calligrapher (Figure 3b, c), and had a gentle sense of humour (Figure 3d). She was also deeply religious and a committed Christian, but while not pressing her beliefs on others, she did firmly rebut the religious criticisms of their work, which she considered to be highly ethical (from Carter interview). However, although very modest and quiet, Purdy could be very determined. Thus, Carter said that she was never of the view that Purdy was weak, but that her quietness might have led some people to have mistaken that for weakness.

Likewise Schulman recalls "... you might be interested in my personal impression of Jean whom I got to know quite well during 1973–74. She was a quiet, determined, exceedingly dedicated woman. She almost worshipped Bob, and believed totally in the value and importance – the "rightness" – of his vision of bringing IVF to the world. She allowed no personal or professional considerations to stand in the way of her IVF work. She got along well with the very different personalities that Patrick and Bob represented ... Jean persisted alongside Bob despite disappointments, setbacks, and repetitive failures, and strengthened Bob's own tremendous toughness and determination. It is almost unbearably tragic to me that someone as good, kind, decent, and really wonderful as Jean was cheated of many years of life, fulfillment, and happiness by an early incurable cancer."

Letters sent to and written by Edwards after Purdy's death are also revealing (RGE3, 1985). "The great input that Jeany gave to our field of human reproduction will always be with us" (to a scientific colleague). "She was so much as a person – excelling not only in the technical arena, but also in public relations and as an individual to whom one could relate spontaneously. She undoubtedly had expertise in medicine – especially in IVF and embryo transfer – but she took this into a much wider sphere. Her death must mean an

Table 3 Recorded presence or absence of Purdy and Edwards at Oldham in relation to days of embryo transfer.

No. ^a	Patient code (attempt)	Laparoscopy		Embryo transfer		Presence in Oldham inferred from expenses			RGE hand-written notes added ^b
		No.	Date	No.	Date	Edwards	Purdy	Others	
169	75 (2)	303	7 Dec 71	1	12 Dec 71	N (left 11th)	Y		Y
173	50 (4)	307	3 Jan 72	2	7 Jan 72	N (left 6th)	Y		3 Jan 72
187	85 (2)	321	16 Mar 72	3	20 Mar 72	N (left 18th)	Y		16 Mar 72
189	57 (3)	323	16 Mar 72	4	20 Mar 72	N (left 18th)	Y		Y
190	71 (3)	324	23 Mar 72	5	27 Mar 72	N (left 25th)	Y		Y
211	107 (2)	345	22 Sep 72	6	25 Sep 72	Y	Y		Y
212	122	346	3 Jan 73	7	5 Jan 73	Y	Y		Y
213	123	347	3 Jan 73	8	5 Jan 73	Y	Y		Y
244	137 (1)	378	25 Jul 73	9	29 Jul 73	Y	Y		Y
245	138	379	8 Aug 73	10	10 Aug 73	N (left 9th)	Y		Y
246	38 (4)	380	6 Dec 73	11	9 Dec 73	Y	Y		Y
250	140	384	9 Dec 73	12	11 Dec 73	Y	Y		Y
253	137 (2)	387	13 Dec 73	13	15 Dec 73	Y	Y		Y
260	107 (3)	394	12 Feb 74	14	15 Feb 74	N absent all Feb	Y	JS	14 Feb 74
261	147 (1)	395	12 Feb 74	15	15 Feb 74	N absent all Feb	Y	JS	14 Feb 74
263	44 (6)	397	11 Mar 74	16	13 Mar 74	N in Oldham for 2 days Mar	Y	JS	Y
268	151	402	18 Mar 74	17	20 Mar 74	N in Oldham for 2 days Mar	Y	JS	Y
274	114 (5)	408	30 Mar 74	18	1 Apr 74	N in Oldham for 5 days Apr	Y	JS	Y
278	158 (1)	412	28 Apr 74	19	30 Apr 74	N in Oldham for 5 days Apr	Y		Y surgical ET
283	135 (2)	417	9 May 74	20	11 May 74	Y	Y	JS	Y
284	54 (4)	418	15 May 74	21	17 May 74	N in Oldham for 5 days May	Y	JS	15 May 74
297	170	431	7 Jun 74	22	9 Jun 74	Y	Y		Y
308	28 (6)	442	26 Apr 75	23	30 Apr 75	Y	N		Y
311	28 (7)	445	19 Jun 75	24	23 Jun 75	Y	N		Y
312	38 (5)	446	19 Jun 75	25	23 Jun 75	Y	N		Y
321	183	455	3 Sep 75	26	10 Sep 75	Y	Y		Y
323	135 (4)	457	3 Sep 75	27	7 & 8 Sep 75	Y	N		Y
326	186 (1)	460	9 Sep 75	28	14 Sep 75	Y	Y		Y
328	188	462	12 Sep 75	29	17 Sep 75	N (left 15th)	Y		Y
329	164 (3)	463	12 Sep 75	30	17 Sep 75	N (left 15th)	Y		Y
335	38 (6)	469	15 Dec 75	31	19 Dec 75	N (left 18th)	Y		Y
336	155 (2)	470	15 Dec 75	32	19 Dec 75	N (left 18th)	Y		Y
337	193	471	16 Dec 75	33	20 Dec 75	N (left 18th)	Y		Y
340	28 (8)	473	18 Mar 76	34	23 Mar 76	Y	N		Y
343	107 (4)	476	20 Mar 76	35	25 Mar 76	Y	Y		Y
350	201	483	10 Jun 76	37	14 Jun 76	N (left 11th/back15th)	Y		Y
351	202	484	15 Jun 76	38	19 Jun 76	Y	Y		Y
353	176 (2)	486	15 Jun 76	39	19 Jun 76	Y	Y		Y
354	92 (5)	487	18 Jun 76	40	22 Jun 76	Y	Y		Y
355	204	488	18 Jun 76	41	22 Jun 76	Y	Y		Y
357	200 (2)	490	19 Jun 76	42	24 Jun 76	Y	Y		Y
358	185 (2)	491	21 Jun 76	43	26 Jun 76	Y	Y		Y
359	206	492	21 Jun 76	44	26 Jun 76	Y	Y		Y
361	188 (2)	494	23 Jun 76	45	28 Jun 76	Y	N		Y
362	208	495	24 Jun 76	46	29 Jun 76	Y	N		Y
363	209 (1)	496	1 Jul 76	47	5 Jul 76	Y	N		Y
365	211	498	2 Jul 76	48	6 Jul 76	Y	N		Y
367	131 (3)	500	3 Jul 76	49	8 Jul 76	Y	N		Y
368	213 (1)	501	3 Jul 76	50	8 Jul 76	Y	N		Y
371	215	601	3 Sep 76	51	7 Sep 76	Y	N		Y
374	217	604	5 Sep 76	52	9 Sep 76	Y	N		Y
375	218	605	10 Sep 76	53	14 Sep 76	Y	Y		Y
377	28 (9)	607	11 Sep 76	54	15 Sep 76	Y	Y		Y
378	207 (2)	608	12 Sep 76	55	16 Sep 76	Y	Y		Y
382	199 (2)	612	18 Sep 76	56	21 Sep 76	Y	Y		Y

Table 3 (continued)

No. ^a	Patient code (attempt)	Laparoscopy		Embryo transfer		Presence in Oldham inferred from expenses			RGE hand-written notes added ^b
		No.	Date	No.	Date	Edwards	Purdy	Others	
386	226	616	8 Dec 76	57	13 Dec 76	Y	Y	Y	
389	229	617	10 Dec 76	58	14 Dec 76	Y	Y	Y	
391	57(5)	619	10 Dec 76	59	14 Dec 76	Y	Y	Y	
396	233	624	17 Dec 76	60	20 Dec 76	Y	Y	Y	
401	237 (1)	629	16 Feb 77	61	18 Feb 77	N (left 16th/ back 21st)	N (left 15th/ back 21st)	Y	
407	38 (7)	635	21 Feb 77	62	25 Feb 77	Y	Y	Y	
409	244	637	21 Feb 77	63	25 Feb 77	Y	Y	Y	
412	247 (1)	640	23 Feb 77	64	26 Feb 77	Y	Y	Y	

^aThis is the number assigned to each potential laparoscopy attempt in Suppl. Material 2, Elder and Johnson, 2015b.

^bOn day of transfer, otherwise on date indicated.

JS = Joe Schulman; Y = yes; N = no.

incalculable loss to the Edwards–Step toe team” (from Bunny Austin). Edwards’ reply includes “In a sense the historian of those days in Oldham has passed on because she was the one who was preparing documents and cartoons and other interesting things for publication”. “... she was such a wonderful friend to me during a time of great stress and illness in my own life and I was so grateful to the Lord for her love and support at that time” and “we ... are very thankful to the Lord for all the joy and fulfillment that [Jean] has brought to countless numbers of couples because of [her] hard work and dedication to the task in hand” (from a friend who was childless after two miscarriages). “She was a lovely person and warm friend and was greatly admired by all of us who had such a high regard for her and for her significant contribution to this unique development” (from a resident of Cambridge and possible friend). “As long as I can remember, she has been a loving quiet friend of the family” (from another friend).

Edwards’ remarks about Purdy

Aside from the description by Edwards (Edwards and Steptoe, 1980, p.122) of Purdy as being “particularly good with the patients”, and her “cooperation had become crucial. It was no longer just Patrick and me. We had become a threesome”, we also have his comments made in an increasingly ill-tempered exchange of letters with Mr D Killion, then sector administrator at Oldham Royal Infirmary, which started in July 1980, in connection with the proposed wording on a plaque to be mounted on Dr Kershaw’s Hospital. In a previous letter, Edwards asks for two plaques, one for Oldham and District General Hospital and the other for Kershaw’s, in which acknowledgement of all the key participants could feature, naming Jean Purdy (at both sites), Muriel Harris and James Holmes (at Kershaw’s) and John Webster and The Theatre and Midwifery Staff (at Oldham General). On receiving a reply saying that only one plaque was possible, Edwards replied in January 1981 saying:

I feel strongly about the inclusion of the names of the people who helped with the conception of Louise Brown. I feel this especially about Jean Purdy, who travelled to Oldham with me for 10 years, and contributed as much as I did to the project. Indeed, I regard her as an equal contributor to Patrick Steptoe and myself, and this

was acknowledged by Patrick Steptoe in the book we published together called “A Matter of Life”. ... If you could modify the wording of the plaque which I suggested for Dr Kershaw’s, then this would probably be a compromise between the two of us. The plaque would then read:-

“Human in vitro fertilization followed by the world’s first successful pregnancy was performed at this hospital by Dr. Robert Edwards, Mr. Patrick Steptoe, Miss Jean Purdy and their supporting staff in November, 1977”

I feel this must be my last letter on this subject. As you see, I am of the opinion that Kershaw’s was the centre of the scientific work, which was to prove decisive in the end ... The plaque, as I have indicated, would give a fair recognition of the work carried out at Kershaw’s. (RGE4, 1981)

In fact, the plaque at Kershaw’s did not acknowledge Purdy’s (or indeed Muriel Harris’ considerable) contribution (Figure 4a), and neither did the later plaque at Oldham General (Figure 4b), about which Edwards also complained forcefully in letters to Mrs MF Firth (chair of the Oldham NHS Trust) dated 16 April and 7 May 1992: “I thoroughly disapprove of the plaque and strongly believe it should be altered.” (RGE5, 1992). Indeed, even the plaque at Bourn Hall, unveiled as recently as July 2013, does not mention Jean Purdy (Figure 4c). Thankfully, a recently unveiled blue plaque at Kershaw’s hospital does include Purdy in the recognition (Figure 4d; <http://biologyheritage.societyofbiology.org/bcw-people/jean+purdy>).

Finally, Purdy’s obituary in *The Times*, (Obit, 1985), although anonymous, was widely believed to have been written by Edwards, and says: “She was the first person in the world to recognize and describe the formation of the early human blastocyst ... She contributed much to the establishment of the ethics of embryo care so essential to the development of treatments of infertile couples ... She participated in the detailed examination of embryonic nuclei ... She will be sadly missed ... not least by the patients.”

General discussion

In this general discussion, we reassess the role of Jean Purdy in the research, after first offering a brief biography. Jean

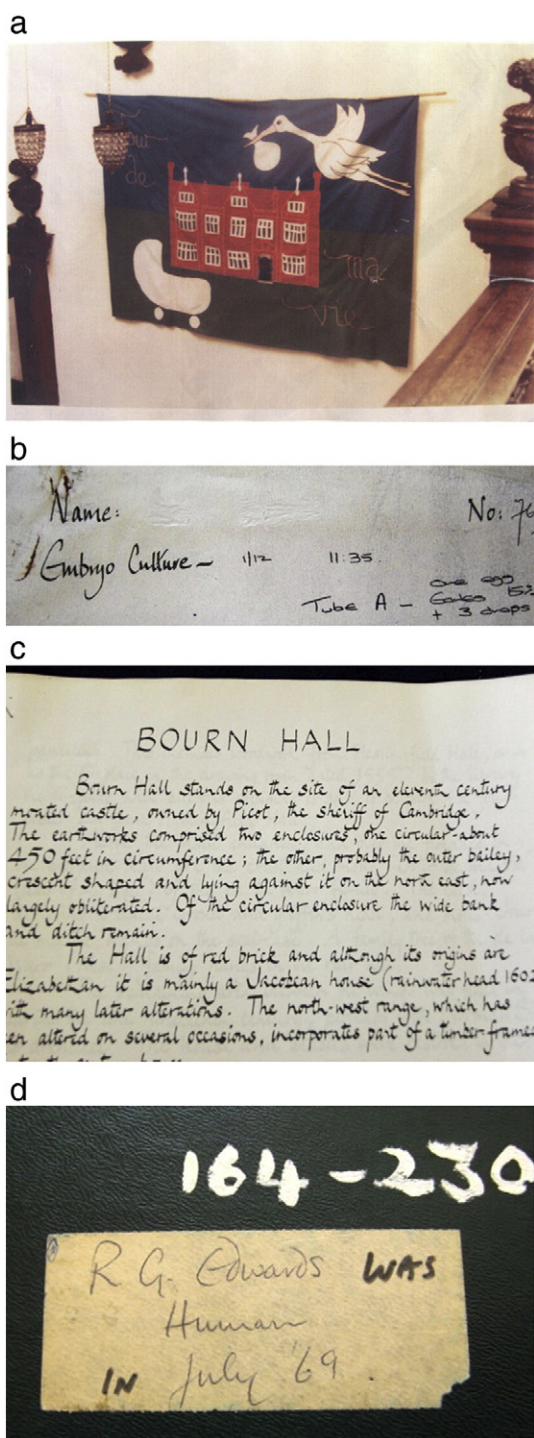


Figure 3 Example of Purdy's artistic and calligraphic abilities and of her sense of humour. (a) Tapestry with the Bourn Hall motto that is inscribed over the front door to the Hall: "*Jour de ma vie*". (b) Example of laboratory headed paper used in 1980, 'Embryo Culture' written in calligraphy by Purdy. (c) Bourn Hall history recorded in calligraphy by Purdy. (d) Cover of Notebook L1, labelled in Edwards' handwriting as "RG Edwards, Human, July '69."; additions in Purdy's hand converted this to "RG Edwards WAS Human IN July '69".

Marian Purdy was born in Cambridge on 25 April 1945 (Birth register vol 3B, p. 820), and died of malignant melanoma aged 39 on March 16 1985 (Fig. 5). Purdy lived at the family home, a semi-detached house at 61 Langham Road, off Perne Road, Cambridge with her father (George), her mother (Gladys May) and her elder brother (John; for family tree see Figure 6). After passing the 11-plus examination, she received her secondary education at Cambridgeshire County High School for Girls from 1956 onwards [from Carter interview]. There she studied for O-levels and then passed A-levels in physics, chemistry and biology in 1963, following in her father's footsteps – he worked at the Cavendish Laboratory for much of his working life, although attempts to establish his role there have foundered ("We have a list of employees at the Cavendish Laboratory up to ca. 1970 compiled from Officers Lists [published in *Reporter*] at the back of our hard-copy catalogue of the Lab archives. I could not find Purdy's name among the lists of technical officers. Assistant staff records have largely not been preserved by originating departments. We have very few in the archives." University archivist, 25 May, 2014). So, we assume he worked as a technician. Jean Purdy then trained as a nurse (1963–1966) at Addenbrooke's Hospital in Trumpington Street, gaining her SRN registration and pin number (375932) there on 5 December 1966 (NMC, 1966). She then moved to Southampton General Hospital, but was unhappy there and applied for a research post locally to work on tissue rejection, it being the early days of kidney transplantation, after or during which time she moved to Papworth Hospital, Cambridgeshire, for a short while, before being employed by Edwards in 1968 (from Carter interview).

It was her quality of quiet dedication that Purdy brought to the work in Oldham. As Edwards himself said – they were a team of three now. Our analysis of the Oldham notebooks reveals her key roles in this team. Thus, she was the one who systematically wrote up all of the essential details and records of each case. The notebook labelled 'Tables/Data' is written exclusively in her hand, and contains systematic analysis of all of the data, classified by type of stimulation, response to stimulation and oestrogen levels in follicular and luteal phases (poor/weak/good/strong/very strong), and outcome: No laparoscopy (NL), laparoscopy (L), laparoscopy with nothing removed (LO), oocyte recovery (OR), oocyte recovery + transfer (OR + T), tubal insemination (T. insemin) or timed intercourse (Int). The last section of the notebook contains summarized details of all the natural cycle laparoscopies carried out between November 1977 and July 1978. All of the data in this notebook was used in several publications between 1973 and 1980 (Edwards, 1973, 1974; Edwards and Steptoe, 1974; Edwards et al., 1972, 1980; Steptoe et al., 1976, 1980). According to the admittedly incomplete expenses records, she also spent more time in aggregate and for longer individual periods at Oldham than did Edwards, tracking and recording results of endocrine monitoring, ensuring that all laboratory equipment and supplies were available, making up, sterilizing and testing media of continuously varying recipes (Elder and Johnson, 2015c). This key organizational role continued on the move to Bourn Hall, a property, which was, as reported to us by Carter, found by Purdy. Indeed, according to an oft-repeated story by Edwards (KE, personal memory), he recalled a phone call from a very skeptical estate agent who doubted that Jean's enquiry was 'genuine'. Purdy then played a major role in setting up

the successful IVF programme there. Thus, a comprehensive, detailed 130-page report (undated) which presents the proposals and technical specifications for all the facilities that would be required for the building conversion into a clinic,

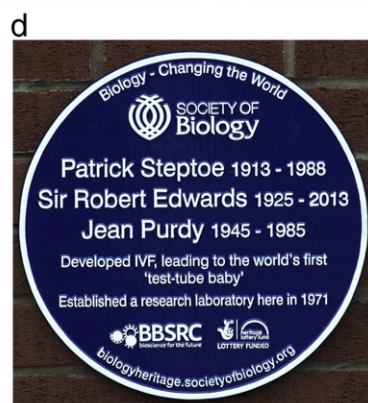
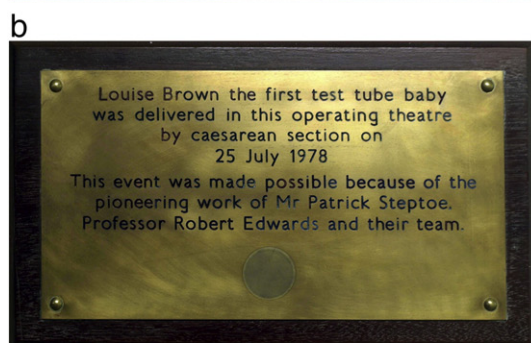


Figure 5 Headstone for Jean Purdy's grave in Grantchester churchyard.

thanks Purdy for the "wealth of information provided and ... technical assistance" in the preparation of the report. She is listed under Scientific Staff as "Dr Edwards' Assistant (Miss Jean Purdy)". Likewise, Alan Dexter recalls that although all of his dealings, conversations and correspondence were with Edwards, he was certain that Purdy was largely responsible for setting out the technical details. Alan Dexter also said (6 August 2014):

In all the time that I was involved with Bob, both at my initial meeting with him in his lab in Cambridge, and through the early years of Bourn Hall, Jeannie was an integral part of his work and data gathering and analysis. Bob never omitted reference to Jeannie's contribution whenever he was questioned about the history or the extent of research undertaken ... Further, when Mary Warnock (as she then was) and her team visited Bourn Hall as part of their work into the ethics of IVF, before the HFEA was formed, I recall all of the papers and excerpts from publications etc. laid out meticulously in the then Board Room (obviously Jeannie's work), which so impressed the visitors.

Indeed, Purdy was described by Carter as being formally titled the "technical director" and the very first Bourn Hall science notebook, found with those described here, has only Purdy's and Edwards' handwriting, including a summary of the first 30 cases at the front (Purdy), media 15/10/80 (Edwards), first laparoscopy/follicle aspiration record 23/10/80 (Purdy), and first embryo records (Edwards).

Some may be surprised that Purdy, despite her nursing qualification, did not play a larger role in laparoscopic oocyte retrieval, something that continued at Bourn Hall. However, the operating theatre was very much Steptoe's domain, and in

Figure 4 (a) Plaque currently in place at Dr Kershaw's Hospital, Oldham (courtesy of John Fallows, who has copyright). (b) Plaque outside the operating theatre at Oldham General Hospital (courtesy of John Fallows, who has copyright). (c) Plaque at Bourn Hall dedicated to Patrick Steptoe and Robert Edwards, unveiled at the celebration of Louise Brown's thirty-fifth birthday in July 2013 (with kind permission from Bourn Hall Ltd). (d) Blue plaque unveiled on the 19 March 2015 at Dr Kershaw's Hospice (formerly Hospital; courtesy of John Fallows, who has copyright).

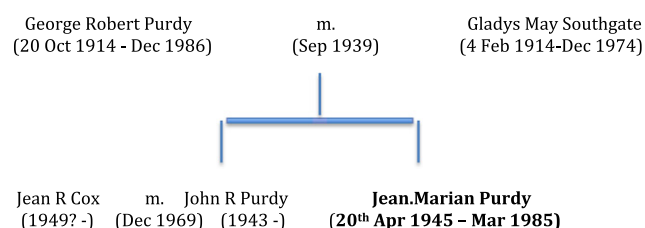


Figure 6 Family tree for Jean Purdy.

Muriel Harris and her staff (many of whom moved to Bourn with him; SE, p.3), he already had a team well used to laparoscopic surgery. Purdy's interests were clearly focused on the research and development aspects, especially those exploring viable embryo development and improved transfer procedures. For example, in a film made in 1980 (Williams, 1980), she talks about a modification to the transfer cannula that she was trying. Thus, whilst Edwards provided the ideas and the intellectual stimulation and Steptoe the authoritative clinical skills, it is arguable that without Purdy's systematic approach and dedicated contributions, the project at Oldham may have faltered. The absence of any public acknowledgement, in spite of Edwards' effort, we believe to be an error, which this historical research helps to document and correct (and which indeed led directly to her inclusion on the blue plaque; Figure 4d). Perhaps Jean Purdy's contribution and personality is captured best by Professor Roger Gosden's blog 'Dear Jean' (Gosden, 2013) an extract from which we quote to close this paper:

I wish I had asked if you ever wanted to be famous. Had you stayed you would have been queen of the realm—earning awards, dinners in your honor, and guest lectureships everywhere. I guess you were happy to be spared that kind of attention, preferring the undisturbed backroom where you could counsel patients and care for their embryos. You were content for Bob and Patrick to be the front men. Bob will go down in history as a scientific pioneer ... Did you ever mind standing in Bob Edwards' shadow? He was generous with compliments, saluting you as the third pioneer of IVF beside Patrick Steptoe and himself, but as the assistant to a famous scientist and a gynecologist (*and being female*) you didn't have much visibility with biographers and the press. The longer you are away the deeper the mystery of your part in the program, and now that both men are gone there is no one left to tell the full story.

We hope that this paper goes some way towards correcting the record about Purdy's contributions.

Acknowledgements

Our thanks to the following for helpful advice: Mike Macnamee (CEO, Bourn Hall for his continuing support and help with Bourn Hall archive material), Noni and John Fallows (for their continuing support and help), Dmitriy Myelnikov and Jane Denton (Multiple Births Foundation) for their help in tracing Purdy's qualifications, Barbara Rankin (former secretary to Bob Edwards), Alan Dexter (former managing director of Bourn Hall), Roger Gosden (former PhD student of Edwards), Joe Schulman (geneticist, reproductive biologist, and founder of the Genetics & IVF Institute), and Rosemary Carter (friend of Purdy; all for background information about her), Jacqueline Cox for her help

in accessing archives (University Archives, Cambridge University Library), Chi Wong (for his help with plotting data), Andrew Steptoe and Joe Schulman (for their permission to quote from personal papers), and John Fallows for allowing us to quote him and for permission to use some of his photographs. The research was supported by grants from the Wellcome Trust (088708, 094985 and 100606), which otherwise had no involvement in the research or its publication.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.rbms.2015.04.005>.

References

- AS1, 1975. Letter from Steptoe to Professor N Morris, Charing Cross hospital, London, dated 1st December 1975, stating that was about to have a hip replacement that day. Personal papers of Andrew Steptoe.
- CCC1, 1974. Reports in the Cambridge Evening News (microfiche copies) of 13th June and 25th May 1974.
- Cole, R.J., Edwards, R.G., Paul, J., 1965. Cytodifferentiation in cell colonies and cell strains derived from cleaving ova and blastocysts of the rabbit. *Exp. Cell Res.* 37, 501–504.
- Cole, R.J., Edwards, R.G., Paul, J., 1966. Cytodifferentiation and embryogenesis in cell colonies and tissue cultures derived from ova and blastocysts of the rabbit. *Dev. Biol.* 13, 385–407.
- Edwards, R.G., 1970. Immunology of conception and pregnancy. *Br. Med. Bull.* 26, 72–78.
- Edwards, R.G., 1973. Physiological aspects of human ovulation, fertilization and cleavage. *J. Reprod. Fertil. (Suppl.)* 18, 87–101.
- Edwards, R.G., 1974. Follicular fluid. *J. Reprod. Fertil.* 37, 189–219.
- Edwards, R.G., Hollands, P., 1988. New advances in human embryology: implications of the preimplantation diagnosis of genetic disease. *Hum. Reprod.* 3, 549–556.
- Edwards, R.G., Sharpe, D.J., 1971. Social values and research in human embryology. *Nature* 231 (87–91), 1971.
- Edwards, R.G., Steptoe, P.C., 1974. Induction of follicular growth, ovulation and luteinization in the human ovary. *J. Reprod. Fertil. (Suppl.)* 22, 121–163.
- Edwards, R.G., Steptoe, P.C., 1980. *A Matter of Life*. Hutchinson, London.
- Edwards, R.G., Steptoe, P.C., Abraham, G.E., Walters, E., Purdy, J.M., Fotherby, K., 1972. Steroid assays and preovulatory follicular development in human ovaries primed with gonadotrophins. *Lancet* ii, 611–615.
- Edwards, R.G., Steptoe, P.C., Purdy, J.M., 1980. Establishing full term human pregnancies using cleaving embryos grown *in vitro*. *Br. J. Obstet. Gynaecol.* 87, 737–756.
- Elder, K., Johnson, M.H., 2015a. The Oldham Notebooks: an analysis of the development of IVF 1969–1978. I. Introduction, materials and methods. *Reprod. BioMed. Soc.* 1, 3–8.
- Elder, K., Johnson, M.H., 2015b. The Oldham Notebooks: an analysis of the development of IVF 1969–1978. II. The treatment cycles and their outcomes. *Reprod. BioMed. Soc.* 1, 9–18.
- Elder, K., Johnson, M.H., 2015c. The Oldham Notebooks: an analysis of the development of IVF 1969–1978. III. Variations in procedures. *Reprod. BioMed. Soc.* 1, 19–33.
- Gosden, R., 2013. rogergosden.com/2013/08/10/dear-jean/
- Hollands, P., Edwards, R.G., 1986. The fate of embryonic cells grafted into X-irradiated recipients. *Hum. Reprod.* 1 (supplement 2), 40.
- Howe, C.W.S., 1971. Immunological components of the maternal response to pregnancy in the mouse. Thesis title, UCA BOGS 2. University of Cambridge 1971–1976 (never submitted).
- Johnson, M.H., 2011. Robert Edwards: the path to IVF. *Reprod. BioMed. Online* 23, 245–262.

- Johnson, M.H., Elder, K., 2015a. The Oldham Notebooks: an analysis of the development of IVF 1969–1978. IV. Ethical aspects. *Reprod. BioMed. Soc.* 1, 34–45.
- Johnson, M.H., Elder, K., 2015b. The Oldham Notebooks: an analysis of the development of IVF 1969–1978. VI. Sources of support and patterns of expenditure. *Reprod. BioMed. Online* 1, 58–70.
- JS1, 2010. Copy of a notebook kept by Dr. Joe Schulman of his work at Kershaw's Hospital in 1974 (Restricted access – see JS).
- NMC, 1966. *Nursing and Midwifery Council records for Jean Purdy: Index to the Register of Nurses p. 69, and The Register, volume 93, p. 549.*
- Obit, 1985. Miss Jean Purdy. *The Times*, Tuesday March 19th issue 62090; p. 16, column G.
- RGE1, 1974. Letter from Joe Schulman at NIH to Edwards dated 8th July 1974 say that have arrived safely, and asking “how our last two patients are doing, or if they too have failed”. *Gen. Lett.* 60 (Folder).
- RGE2, 1973. Letter from Ian Fergusson to Purdy dated 31st October 1973 thanking her for her “comprehensive list of equipment”. *Gen. Lett.* 54 (Folder).
- RGE3, 1985. Letters to and from Edwards after Purdy's death. *Significant Items* 36 (Folder).
- RGE4, 1981. Letters between Edwards and Mr Killion concerning the wording on a plaque. *Gen. Lett.* 95 (Folder).
- RGE5, 1992. Letters between Edwards and Mrs MF Firth (chair of the Oldham NHS Trust) dated 13th and 16th April and 7th May 1992 concerning the wording on a plaque. *Patient Matters* (Box 3).
- RGE6, 1969. Letters including statements about leave granted by University. *Gen. Lett.* 3 (Folder).
- Schulman, J.D., 2010. Robert G. A Personal Viewpoint. Amazon, Edwards.
- Step toe, P.C., Edwards, R.G., Purdy, J.M., Step toe, P.C., Edwards, R.G., Purdy, J.M., 1976. The recovery of human preovulatory oocytes, fertilization in vitro, cleavage and embryo transfer. *Recent Adv. Hum. Reprod. Proceedings of the First International Congress on Human Reproduction, Rio de Janeiro. Recent Advances in Human Reproduction. Excerpta Medica, Amsterdam*, pp. 285–295.
- Step toe, P.C., Edwards, R.G., Purdy, J.M., 1980. Clinical aspects of pregnancies established with embryos grown *in vitro*. *Br. J. Obstet. Gynaecol.* 87, 757–768.
- Williams, P., 1980. A film called Test Tube Explosion made by Peter Williams TV for Television South in 1980.
- Wright, P., 2013. Prof Edwards played a big role. Letter in *Cambridge News and Crier*, April 18th, p. 6.
- Yovich, J.L., 2011. A clinician's personal view of assisted reproductive technology over 35 years. *Reprod. Biol.* 11 (Suppl.3), 31–42.